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ON THE SPECIALIZATION OF THE ALL-UNION SCIENTIFIC-RESEARCH INSTITUTE OF MEDICAL INSTRUMENTS AND EQUIPMENT

[Following is a translation of an article by I. P. Smirnov in Meditsinskaya Promyshlennost' SSSR (Medical Industry USSR), Vol. XIV, No. 4, Moscow, 1960, pages 3-6.]

The group of the All-Union Scientific Research Institute of Medical Instruments and Equipment has greeted the act of the Tsk KPSS /Central Committee of the Communist Party of the Soviet Union/ and the Council of Ministers USSR "Measures for the Further Improvement of the Medical Service and Safeguarding of the Health of the Population of the USSR" with tremendous enthusiasm.

A considerable expansion of work in the field of creating new medical technical equipment has been provided by the act.

The possibilities of the most complete and proper utilization of scientific and engineering personnel are being opened up through the accurate categorization

and specialization of the Institute.

The All-Union Scientific Research Institute of Medical Instruments and Equipment was created in May 1944. At that time the medical-instrument industry was in the initial stage of its development; the nomenclature of the articles produced did not number more than 700 items; there was little complex medical equipment produced, and the quality of production was low.

The group at the Institute has fulfilled the functions of a branch construction bureau and a branch technological laboratory for 10 years.

Hundreds of medical items, scores of medical instruments and apparatuses (including apparatuses for suturing blood vessels), many current technological processes, numerous standards and technical conditions were created and mastered by the industry with the participation of the Institute workers. The oldest workers in the Institute--~~are-the-following:~~ V. V. Fedurkin, Yu. F. Kabatov, B. P. Zvorono, A. G. Nesterenko, T. D. Moldover, M. D. Pekarskiy, L. M. Rybakov, A. A. Kolosov, E. B. Rozenfel'd, V. A. Mikhalev, G. S. Freydin, A. R. Livenson, A. S. Perel'mutr--and many other workers are enjoying deserved renown and respect at the plants of the medical-instruments industry.

The variety of technological processes, equipment and extensive nomenclature of production put out by

the enterprises of the medical-instrument industry have led to the fact that a large number of small subdivisions has been formed in the Institute leading to work on the most varied technical and scientific trends and are without an adequate number of scientific and engineering personnel. Such a situation leads to a considerable increase in the time necessary for carrying out various operations. If we also take into consideration the longer periods needed for mastering the production of new items by industry it becomes clear that with such tempos of development it is difficult to provide the high technical level of the entire medical technical equipment production serially produced by Soviet plants.

The organization of the Scientific Research Institute of Experimental Surgical Apparatus and Instruments and the creation of construction bureaus have made it possible to eliminate a number of trends from the VNII MIIO /All-Union Scientific Research Institute of Medical Instruments and Equipment/; however, unfortunately almost the same number of new trends has been organized in the Institute.

At the present time the VNII MIIO, NII EKhAII /Scientific Research Institute of Experimental Surgical Apparatus and Instruments/ are working in this field of medical technics at the present time; the Central Projects-- Construction Bureau of the Ministry of Health USSR in Moscow

and a number of independent construction-technological bureaus are doing the same work. The State Design and Planning Institute of the Ministry of Health USSR (Giprozdrav), the Central Institute of Traumatology and Orthopedics, the Central Scientific Research Institute of Disinfection and others are engaged in the designing of articles of medical technical equipment.

Various research and experimental-construction operations are being carried out for public health by the Scientific Research Institute of Rubber Goods, the Plastics Institutes in Moscow and Leningrad, the Scientific Research Institute of Medical Technical Equipment, and certain Scientific Research Institutes of Light Industry. However, this foundation has already become inadequate. A considerable increase in the scientific-research and experimental-construction personnel is being planned. Affiliates of the VNII MIiO, and the NII EKhAiI will be created; the existing construction bureaus will be expanded, construction departments and laboratories for medical-instrument plants will be organized.

All this creates the necessary conditions for specialization of organizations working in the field of medical technical equipment.

A new circumstance has posed the VNII MIiO group with new problems. The problems to be solved have become

complex; the research work being conducted in the Institute is assuming a progressively deeper scientific nature; the experimental-construction and technological operations are being to be carried out chiefly in the field of apparatus- and instrument- construction; the connections with instrument-construction plants are being consolidated; cooperation with medical and non-medical research institutions is being put into smooth running order.

In just the past two years 45 instruments or apparatuses have been developed at the Institute for purposes of diagnosis and therapy. During this time, 35 instruments and apparatuses were the maximum for mass production by industry. Every year the number of instruments of apparatuses created at the Institute is increasing based on new principles and putting new methods of diagnosis and treatment into the hands of physicians which had hitherto been unknown in the world medical practice: for example, the electrogastrograph, controlled endoscopic instruments, surgical illuminators with the use of ultra-violet rays, and apparatus for pulsating-current therapy based ont the use of super-high frequency waves of an electromagnetic field.

At the Institute there has been an increase in the number of experienced specialist personnel around whom the younger group should rally in the next few years;

these would be capable of solving the complex problems in the incorporation of the latest achievements in the field of radioelectronics, atomic energy,. mechanics, gas dynamics, optics, light, moving picture photography technique, and cybernetics into medicine and the national economy.

In connection with the forthcoming categorization and specialization of organizations working in the field of technical equipment for public health, it seemed practical to us to entrust the VNII MIiO with providing for the development of the following trends in medical technical equipment.

In the scientific-organization field the Institute should be entrusted with a study of the influence of technical equipment on the organization of the national health and on the organization of labor in a medical institution; a scientific grounding of the requirements of institutions and of the organizations of national health for technical equipment; determination of the service periods of medical items; an economic grounding for the adoption of technical facilities; a scientific planning of the development and incorporation of medical technical equipment into national health; the creation of standards and technical conditions assuring the production of high quality articles by industry; provision for the unification and systematization of classification of medical

apparatus- and instrument-construction; the development of normal series and types of instruments, apparatuses and equipment in its own field; the coordination of scientific research and experimental-construction work carried out by the scientific research institutions, construction bureaus and plant laboratories which are in the same field as the Institute.

In planning the technical reequipping of national health the experience of the incorporation of technical equipment into the national economy should not be overlooked. Instruments and apparatuses for medical institutions should be appraised from the viewpoint of their providing for the comprehensive mechanization and automation of all labor processes in a medical institution.

The role of mechanization and automation and the importance ascribed to them by the Tsk KPSS /Central Committee of the Communist Party of the Soviet Union/ and the Soviet government are generally known. In recent party directives the need for economically grounding comprehensive mechanization and automation has been emphasized particularly. Operations on comprehensive mechanization and automation in medical institutions should be widely reflected in the thematics plans of the VNII MIiO .

In the scientific research field the problems of the Institute should be a study of the possibility and

utilization of the current achievements of technics, physics, chemistry and biology in the creation of new types of apparatuses and instruments for medical science and for medical practice; active aid to medical institutions in working out new methods of treatment and new methods of diagnosis; study of the achievements in the borderlands of knowledge with the aim of timely utilization of them for national health; the creation of new apparatuses and instruments necessary for solving problems posed to medical science by the act of the TsK KPSS /Central Committeee of CPSU/ and the Council of Ministers USSR in the field of cardiovascular pathology, malignant tumors, prophylaxis of influenza, sore throats, and gastrointestinal diseases. The progress of medical science at the present time depends completely on the degree of utilization of technical equipment by it. Even now instruments may be created and utilized extensively for the investigation of the basal metabolism, for the study of metabolic processes occurring in the gastrointestinal tract, for the investigation of the influence of natural physical factors, solar radiation, heat, cold, moisture, gravity, the magnetic field of the earth, and cosmic radiation. Instruments may be created for the study of the effect of various physical and chemical factors created in the environment as the result of human activity.

Attention should be given to the creation of apparatuses for producing various physical factors with the aim of influencing the living organism,. stimulation or inhibition of the metabolic processes. A solution of these problems lies at the junction points of technics, physics, biology, biochemistry, biophysics and physiology. Atomic energy technics, radiospectroscopy, radioelectronics, amplification technics, computer technics and cybernetics, the current physicochemical and chemicophysical achievements, new materials, technics of motion picture photography-- this is the far from complete arsenal of facilities which should be used in medical science and public health today.

The creation of diagnostic machines, card files with electronic memory, instruments for making very fine chemical analyses, serious of various instruments and devices for rush analyses of exhaled gases, blood, urine, stool, mucus and other excretions does not offer any considerable difficulty to modern technics. In short, the achievements of modern technics and physics are now providing for the possibility of creating and organizing the industrial production of various simple and complex technical apparatuses which extend the possibilities of medicine in the field of diagnosis and treatment by many times.

In solving problems associated with the incorporation of new technics into public health, however, we should not

forget the quantitative aspect of this important matter. It is essential that the incorporation of technics into medicine be associated with a reduction in the labor expenditure of medical personnel in determining and treating diseases. At the present time, these expenditures are tremendous. On the average, even in large hospitals, from one to 1.5 persons of the medical and service personnel are needed per bed. This dictates the need for the organization of work in technical-economic research, in determining the effectiveness of the topics being planned for accomplishment at the Institute.

The authority of the Institute depends entirely on its output, on its influence on the activity of medical institutions, on the number of instruments working effectively in them which have been created in the Institute. This may be achieved only under conditions of a close association of it with plants which serially produce the medical instruments newly developed by the Institute.

For the purpose of accelerating the mastery of production of new models of medical technical equipment and for the purpose of making them cheaper considerable attention should be given to technological science. The development of new specific technological processes characteristic of medical apparatus- and instrument-construction, and the improvement in the technological construction and

incorporation of new material, new metal alloys, new types of glass and ceramics into public health--all these problems should occupy an important place in the work of the Institute.

A trend begun many years ago at the Institute in the creation of objective methods and instruments for evaluating the quality of production has become even more promising. Plants and medical institutions need instruments for evaluating the functional characteristics of the instruments and apparatuses. Among them there may be various types of dose meters for determining the doses of light, thermal, X-ray, magnetic, electromagnetic and radiation energies, measuring instruments for gas and air currents, apparatuses for testing the reliability of various products under different operational conditions making it possible to check these products for the number of times they can be used, for vibration, corrosion, strain, etc.

As a result of the forthcoming specialization the profiles and fronts of operations carried out by the VNII MIO will be narrowed considerably. The Institute should be freed from the development of instruments and apparatuses based on the utilization of methods and treatment of diagnosis already known and of operations for the modernization of the products being produced. These problems should be solved by the

plant construction bureaus.

It would be practical to give the NII EKhAiI entirely the work on the technology of preparation of medical instruments.

It is essential that special subdivisions be created in all specialized interdepartmental organizations called on to provide for the needs of national health for medical technical equipment. These subdivisions should participate actively and in conjunction with the medical institutions in the solution of problems advanced by national health, should work without the aid of intermediaries. This alone will improve the quality of the work and increase the responsibility of those carrying out the work to the Ministry of Health USSR as the direct customer.

The act of the Tsk KPSS /Central Committee of the CPSU/ and of the Council of Ministers USSR has opened up new broad perspectives of creative work before the Institute. There is no doubt of the fact that the Institute group will apply all its efforts, all its energy so as to satisfy in a worthy manner the Soviet Communist Party and the Soviet Government with respect to their concern for the welfare of the Soviet people.

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